

U.S. Patent Application No. 09/945,340
Request for Reconsideration dated October 13, 2006
Reply to Office Action dated June 14, 2006

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REMARKS

Reconsideration and continued examination of the above-identified application are respectfully requested.

In the Office Action dated June 14, 2006, claims 5, 16-76, 78 and 79 are rejected. No claim is allowed.

Information Disclosure Statement filed August 30, 2005

The applicants filed a Supplemental Information Disclosure Statement on August 30, 2005. The applicants have not received a returned copy of the Form PTO-SB-08 (2 pages), which shows the Examiner's consideration of these cited documents. The Examiner is respectfully requested to provide a copy of the Form PTO-SB-08 that reflects his consideration of these documents.

Election/Restriction

At page 2 of the Office Action, the Examiner asserts that the present application contains claims 11-15 drawn to an invention non-elected with traverse and a complete reply to the final rejection must include cancellation of non-elected claims or other appropriate action. The applicants respectfully submit that claims 11-15 are not canceled at this time in order to reserve the right to pursue the subject matter of claims 11-15 and to further reserve the right to seek appropriate review of the restriction requirement at the appropriate time.

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Rejection of claims 5, 16, 19, 21, 28, 31, 33, 39, 42, 44, 51 and 53 under 35 U.S.C. §102(b) over Stalling et al.

At page 2 of the Office Action, the Examiner rejects claims 5, 16, 19, 21, 28, 31, 33, 39, 42, 44, 51, and 53 under 35 U.S.C. §102(b) over Stalling et al. (U.S. Patent No. 5,308,481) for the reasons of record. The Examiner provides additional comments in response to applicants' arguments made in the response dated December 19, 2005. At page 3 of the Office Action, the Examiner states that it appears that the applicants are arguing that none of the groups disclosed by Stalling et al. have the aromatic portion of the defined group attached to the carbonaceous material. Further, the Examiner asserts that the instant claims do not require direct attachment of a benzene or phenyl to the carbonaceous material. The Examiner alleges that Figure 10B of Stalling et al. does disclose an aromatic group, since the specification defines Ar as an aromatic radical such as an aryl or heteroaryl group. The Examiner therefore takes the position that the present claims are clearly encompassed and anticipated by the Stalling et al. patent. The Examiner then alleges that the core-shell particle attached to the fullerene, as disclosed by Stalling et al., would read on the carbonaceous material that has an attached polyethylene glycol derivative as claimed. For the following reasons, this rejection is respectfully traversed.

The applicants respectfully submit that the Examiner has misinterpreted the Stalling et al. reference with respect to the claimed invention. The applicants' arguments made in the previous response are incorporated herein. In order to facilitate the Examiner's understanding of the claimed invention, portions of the applicants' prior arguments are reiterated herein. Additional arguments against the Examiner's new comments with respect to the rejection follow.

Independent claim 5 is directed to a separation device comprising a mobile phase and a

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stationary phase, wherein the stationary phase comprises carbonaceous material having attached at least one of the specifically defined organic groups set forth in the claim. As described for example at page 8, lines 22 - 28 and elsewhere in the present specification, the attached organic group affects the adsorbent capacity and selectivity of the carbonaceous material. Contrary to what is alleged by the Examiner, none of the attached organic groups set forth in claim 5 are described in Stalling et al. In particular, the abstract of Stalling et al., referred to by the Examiner, only states that the invention relates to fullerenes covalently bonded to a polymer particle or a siliceous support particle, and col. 4, lines 58 - 66 of Stalling et al. only describes reactive groups such as $-\text{CH}_2\text{X}$, $-\text{OH}$, $-\text{NH}_2$ and $-\text{COOH}$ being bonded onto the fullerene to facilitate the attachment of the fullerene to a polymer particle. Figure 10B of Stalling et al. shows a linkage between a fullerene and a polymer particle, but this linkage is not made by a group defined in claim 5. Contrary to what is alleged by the Examiner, an "aromatic- $(\text{C}_n\text{H}_{n+1})$ " group is not a group that is defined in claim 5, nor is such a group disclosed in Stalling et al. The Examiner seems to intend to refer to the " $-\text{Ar}-(\text{C}_n\text{H}_{2n+1})_x$ " group, which is included in claims 5 and 19 (and, by dependency, claims 31, 42, 51, and 53). Stalling et al. does not disclose any such group and, in particular, this group is not the linkage that is shown in Fig. 10B of Stalling et al. The formula " $-\text{Ar}-(\text{C}_n\text{H}_{2n+1})_x$ " requires that the aromatic portion of the defined group be attached to the carbonaceous material (since, as noted at page 19, lines 29 - 31, hyphens on one or more ends of a formula indicate the attachment to the carbon product or to another group). Moreover, according to the formula, none of the one or more aliphatic groups that are attached to the aromatic group connect to any other group, but rather, each ends in a methyl group. The linkage shown in Fig. 10B of Stalling et al., on the other hand is a C_8H_{16} chain joined at one end to an

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oxygen atom bonded to a fullerene and joined at the other end to an NH group of a polystyrene-NH₂ polymer particle. Stalling et al. contains no teaching or suggestion of a carbonaceous material having an aromatic group attached to the carbonaceous material and one or more non-linking aliphatic groups (that is, groups that end in CH₃) attached to the aromatic group, as included in claim 5 and as required by claims 19, 31, 42, 51, and 53. Moreover, Stalling et al. contains no teaching or suggestion of a carbonaceous material with an attached phenyl or naphthyl group having ionic or ionizable groups, as included in claim 5 and as required by claims 28 and 39. Moreover, Stalling et al. contains no teaching or suggestion of a carbonaceous material with an attached polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins thereof as included in claim 5 and as required by claims 21, 33, and 44. Contrary to what is alleged by the Examiner, this feature is not disclosed at col. 9, lines 10 - 21 of Stalling et al. This passage of Stalling et al. refers to glycol dimethacrylate, triethyleneglycol dimethacrylate and tetraethyleneglycol dimethacrylate as crosslinking agents that are combined with monomers in the formation of a core-shell polymer particle, which is one of the support particles mentioned in the reference. This particular passage of Stalling et al. has nothing to do with fullerenes, but rather relates to the formation of a specific type of particle to which a fullerene may be attached. Stalling et al. contains absolutely no description of a carbonaceous material that has an attached polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins thereof.

Applicants would like to additionally point out the following to the Examiner. Column 5, lines 34-38 of Stalling et al. describes the polymers and the siliceous supports as support particles that are known for use as adsorbents. The applicants submit that these particles are not or do not

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contain the claimed organic groups. For example, Stalling et al. describes these polymers as polystyrenes, divinyl benzene, and other inorganic substrates (see column 6, lines 3-17 for example). Therefore, Stalling et al. does not teach or suggest a carbonaceous material having attached at least one organic group, wherein the organic group comprises an aromatic group that ends in the methyl group, as claimed. Moreover, Stalling et al.'s Figure 10B does not teach or suggest a carbonaceous material with an attached phenyl or naphthyl group having ionic or ionizable groups, as included in claim 5, and required by claims 28 and 39. Additionally, the cross-linking agents that the Examiner refers to at col. 9, lines 10-21 of Stalling et al., are not the same as the polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins as included in claim 5 and as required by claims 21, 33, and 44. As indicated above, the particular passage of Stalling et al. that the Examiner refers to, has nothing to do with the fullerenes, but rather relates to the formation of a specific type of particle to which a fullerene may be attached. Therefore, Stalling et al. contains no teaching or suggestion of a carbonaceous material with an attached polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins thereof.

Since Stalling et al. does not teach or suggest any of the above-described particular organic groups, Stalling et al. would not teach or suggest any separation device containing a second organic group in addition to one of these particular organic groups as required by claims 28, 31, 33, 39, 42, and 44. Therefore, this rejection should be withdrawn.

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Rejection of claims 17, 29 and 40 under 35 U.S.C. §103(a) over Stalling et al. in view of Kusano et al.

At page 2 of the Office Action, the Examiner still rejects claims 17, 29, and 40 under 35 U.S.C. §103(a) over Stalling et al. in view of Kusano et al. (EP 0 300 448) for the reasons of record. The Examiner provides additional comments in response to applicants' arguments made in the response dated December 19, 2005. At page 4 of the Office Action, the Examiner alleges that Stalling et al. teaches that different attachments of the organic compounds to the fullerenes affect the chromatographic separation of the obtained separation medium and are not there merely for the formation of a lattice structure (col. 4, line 50, to col. 5, line 28). The Examiner takes the position that the secondary references, which include Kusano et al., are cited to show the use of other organic compounds attached to the carbonaceous material. The Examiner again takes the position that it would have been obvious to modify Stalling et al. with the teachings of Kusano et al. on the alleged grounds that Kusano et al. teaches other organic groups attached to a carbonaceous material. For the following reasons, this rejection is respectfully traversed.

The applicants respectfully submit that the Examiner has misinterpreted the Stalling et al. reference with respect to the claimed invention as indicated above. Applicants' arguments above and in the previous response are incorporated herein. In order to facilitate the Examiner's understanding of the both the Stalling et al. and the Kusano et al. references, portions of applicants' prior arguments are reiterated herein. Additional arguments in response to the Examiner's additional comments follow.

Stalling et al. does not teach or suggest any modification of fullerenes with organic groups that affect the selectivity of a chromatographic material and there is no indication that it

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would even be possible to make a stable modification of this type to a fullerene. Kusano et al. does not overcome the deficiencies of Stalling et al. Kusano et al. describes the use of a coating of an optically active amino acid derivative on a substrate to provide a separation medium for separating racemic mixtures. There is no teaching or suggestion in Stalling et al. or Kusano et al., either singly or combined, that the amino acid derivatives of Kusano et al. would be capable of performing the function of facilitating the attachment of fullerenes to polymer particles to form a lattice structure, or even that the amino acid derivatives of Kusano et al. could be attached to fullerenes at all. Kusano et al. does not teach any attachment of its amino acid derivatives to anything, but rather only describes coating the amino acid derivatives onto a substrate.

Regarding the Examiner's reference to col. 4, line 50, to col. 5, line 28, of Stalling et al., the applicants disagree with the Examiner's assertion that Stalling et al. teaches that different attachments of the organic compounds to the fullerenes affect the chromatographic separation of the obtained separation medium and are not there merely for the formation of a lattice structure. It appears that the Examiner is reciting this particular passage to Stalling et al. in response to the applicants' previous arguments regarding the deficiencies of Stalling et al. However, this particular passage only indicates that certain reactive groups can be used to link the fullerenes to the polymer or silica support. At col. 4, lines 64-66, Stalling et al. indicates that the reactive groups are used to form a lattice structure. At col. 5, lines 3-8, Stalling et al. indicates only that chromatography affinity is affected by the type of polymer particle, such as a co-polymer resin particle. As discussed above, these polymer particles that Stalling et al. refers to, are inorganic particles. No where does Stalling et al. teach or suggest that different attachments of organic compounds to the fullerenes affect the chromatographic separation of the obtained separation

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medium. Kusano et al. does not cure the deficiencies of Stalling et al., as discussed above.

Accordingly, Stalling et al. and Kusano et al., either singly or combined, do not teach or suggest a separation device comprising a mobile phase and a stationary phase, wherein the stationary phase comprises carbonaceous material having attached at least an amino acid or derivatized amino acid, cyclodextrin, immobilized protein, polypeptides, or combinations thereof, as required by claims 17, 29, and 40. Therefore, this rejection should be withdrawn.

Rejection of claims 18, 20, 22 - 27, 30, 32, 34 - 38, 41, 43, 45 - 50, 52, 54 - 76 and 78 - 79 under 35 U.S.C. §103(a) over Stalling et al. in view of Boes et al.

At page 2 of the Office Action, the Examiner rejects claims 18, 20, 22 - 27, 30, 32, 34 - 38, 41, 43, 45 - 50, 52, 54 - 76 and 78 - 79 under 35 U.S.C. §103(a) over Stalling et al. in view of Boes et al. (U.S. Patent No. 5,807,494) for the reasons of record. The Examiner provides additional comments in response to applicants' arguments made in the response dated December 19, 2005. At page 4 of the Office Action, the Examiner responds to applicants' previous arguments. Particularly, the Examiner's comments on the combination of Stalling et al. with Boes et al., are the same as with the combination of Stalling et al. and Kusano et al., as indicated above. For the following reasons, this rejection is respectfully traversed.

The deficiencies of Stalling et al. are indicated above. The applicants' arguments above and in the previous response are incorporated herein. In order to facilitate the Examiner's understanding of the deficiencies of both the Stalling et al. reference and the Boes et al. reference, portions of the arguments made in the previous response are reiterated below. Additional arguments in response to the Examiner's additional comments follow.

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Stalling et al. only describes groups such as $-\text{CH}_2\text{X}$, $-\text{OH}$, $-\text{NH}_2$ and $-\text{COOH}$ that are capable of facilitating the formation of a lattice structure. Boes et al., on the other hand, describes carbon black products that have attached organic groups that provide the advantage of increased water dispersibility (see, for example, col. 5, lines 23 - 37 of Boes et al.). Clearly, this objective of providing increased water dispersibility is directly at odds to the objective in Stalling et al. of joining particles together into a lattice. There is no teaching or suggestion in Boes et al. of using organic groups to attach carbon black particles to anything else. Therefore, a person skilled in the art would not be motivated to modify Stalling et al. with the teachings of Boes et al. Moreover, since Stalling et al. does not teach or suggest any other use for reactive groups attached to the fullerenes except for providing the fixation of fullerenes and polymer or siliceous particles and since Boes et al. contains no disclosure relevant to chromatography at all, the motivation described in the present application of affecting the adsorption properties and the selectivity of a chromatographic material by attaching organic groups is not found in either reference, taken singly or combined.

With respect to the Examiner's additional comments regarding the combination of Stalling et al. and Boes et al. on page 4 of the Office Action, since these comments apply both to the Boes et al. and the Kusano et al. references, applicants' arguments with respect to the combination of Stalling et al. with Kusano et al. indicated above, apply equally here. Those arguments are incorporated herein. Boes et al. does not cure the deficiencies of Stalling et al., as indicated above.

Accordingly, Stalling et al. and Boes et al., either singly or combined, do not teach or suggest a separation device comprising a mobile phase and a stationary phase, wherein the

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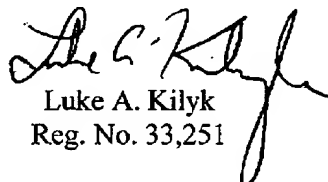
stationary phase comprises carbonaceous material having attached thereto the specific groups required by claims 18, 20, 22 - 27, 30, 32, 34 - 38, 41, 43, 45 - 50, 52, 54 - 76, and 78 - 79. Therefore, this rejection should be withdrawn.

CONCLUSION

In view of the foregoing remarks, applicants respectfully request the reconsideration of this application and the timely allowance of the pending claims.

If there are any other fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,


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